

LIST OF CONTENTS

Number 1

Review

- | | | |
|--|-----|---|
| M. Singh and K. K. Mohanty | 1 | Dynamic modeling of drainage through three-dimensional porous materials |
| R. S. Besser, X. Ouyang and H. Surangalikar | 19 | Hydrocarbon hydrogenation and dehydrogenation reactions in microfabricated catalytic reactors |
| J. B. Klauda and S. I. Sandler | 27 | Phase behavior of clathrate hydrates: a model for single and multiple gas component hydrates |
| Y.-S. Seo, S.-P. Yu, S.-J. Cho and K.-S. Song | 43 | The catalytic heat exchanger using catalytic fin tubes |
| H. K. Nahra and Y. Kamotani | 55 | Prediction of bubble diameter at detachment from a wall orifice in liquid cross-flow under reduced and normal gravity conditions |
| S. Farooq and I. A. Karimi | 71 | Dispersed plug flow model for steady-state laminar flow in a tube with a first order sink at the wall |
| K. Huang, X.-L. Zhan, F.-Q. Chen and D.-W. Lü | 81 | Catalyst design for methane oxidative coupling by using artificial neural network and hybrid genetic algorithm |
| A. I. Anastasov | 89 | An investigation of the kinetic parameters of the <i>o</i> -xylene oxidation process carried out in a fixed bed of high-productive vanadia-titania catalyst |
| S. S. Sablani, W. H. Shayya and A. Kacimov | 99 | Explicit calculation of the friction factor in pipeline flow of Bingham plastic fluids: a neural network approach |
| Y. Ito, R. Kamakura, S. Obi and Y. H. Mori | 107 | Microscopic observations of clathrate-hydrate films formed at liquid/liquid interfaces. II. Film thickness in steady-water flow |
| R. van Hout, L. Shemer and D. Barnea | 115 | Evolution of hydrodynamic and statistical parameters of gas-liquid slug flow along inclined pipes |
| K. Loubière and G. Hébrard | 135 | Bubble formation from a flexible hole submerged in an inviscid liquid |
| K.-K. Tan and R. B. Thorpe | 149 | Transient instability of the flow induced by an impulsively started rotating cylinder |
| J. Wang and E. J. Anthony | 157 | A study of thermal-cracking behavior of asphaltenes |
| C. F. Petre, F. Larachi, I. Iliuta and B. P. A. Grandjean | 163 | Pressure drop through structured packings: Breakdown into the contributing mechanisms by CFD modeling |
| D. N. Tsinoglou and G. C. Koltsakis | 179 | Effect of perturbations in the exhaust gas composition on three-way catalyst light off |
| J. Y. Park | 193 | The clustered dense phase model for group A fluidization: I. Dense phase hydrodynamics |

**J. Thibault, D. Taylor, C. Yanofsky,
R. Lanouette, C. Fonteix and K. Zaras**

M. Vicente, J. R. Leiza and J. M. Asua

A. Kavouras and G. Krammer

Technical note

V. V. Tarabara and M. R. Wiesner

**R. Rzehak, H. Müller-Krumbhaar and
W. Marquardt**

G. Yuan and M. A. Keane

**T. Nakamura, T. Makino, T. Sugahara and
K. Ohgaki**

**K. L. Tse, T. Martin, C. M. McFarlane and
A. W. Nienow**

W. Zhang and R. B. H. Tan

I. Iliuta and F. Larachi

**A. Bhagwat, R. Srinivasan and
P. R. Krishnaswamy**

**C. Selomulya, G. Bushell, R. Amal and
T. D. Waite**

S.-S. Hsiau and S.-C. Yang

F. Bloom and T. J. Heindel

**A.-L. Le Coënt, M. Tayakout-Fayolle,
F. Couenne, S. Briançon, J. Lieto,
J. Fitremann-Gagnaire, Y. Queneau and
A. Bouchu**

J. Yun and Z. Shen

203 Multicriteria optimization of a high yield pulping process with rough sets

215 Maximizing production and polymer quality (MWD and composition) in emulsion polymerization reactors with limited capacity of heat removal

223 Distributions of age, thickness and gas velocity in the cake of jet pulsed filters—application and validation of a generations filter model

239 Computational fluid dynamics modeling of the flow in a laboratory membrane filtration cell operated at low recoveries

247 Liquid-liquid phase transition in flow systems

Number 2

257 Liquid phase catalytic hydrodechlorination of 2,4-dichlorophenol over carbon supported palladium: an evaluation of transport limitations

269 Stability boundaries of gas hydrates helped by methane—structure-H hydrates of methylcyclohexane and *cis*-1,2-dimethylcyclohexane

275 Small bubble formation via a coalescence dependent break-up mechanism

287 A model for bubble formation and weeping at a submerged orifice with liquid cross-flow

297 Magnetohydrodynamics of trickle bed reactors: Mechanistic model, experimental validation and simulations

309 Fault detection during process transitions: a model-based approach

327 Understanding the role of restructuring in flocculation: The application of a population balance model

339 Numerical simulation of self-diffusion and mixing in a vibrated granular bed with the cohesive effect of liquid bridges

353 Modeling flotation separation in a semi-batch process

367 Kinetic parameter estimation and modelling of sucrose esters synthesis without solvent

377 Hydrodynamics of an external-loop gas-lift system with restrictions located in the downcomer

X. S. Wang and M. J. Rhodes	387	Determination of particle residence time at the walls of gas fluidized beds by discrete element method simulation
K. El-Hami, A. Ribbe, S. Isoda and K. Matsushige	397	Structural analysis of the P(VDF/TrFE) copolymer film
R. G. Sherritt, J. Chaouki, A. K. Mehrotra and L. A. Behie	401	Axial dispersion in the three-dimensional mixing of particles in a rotating drum reactor
S. Ebrahimi, R. Kleerebezem, M. C. M. van Loosdrecht and J. J. Heijnen	417	Kinetics of the reactive absorption of hydrogen sulfide into aqueous ferric sulfate solutions
Y. Zhang, M. A. Henson and Y. G. Kevrekidis	429	Nonlinear model reduction for dynamic analysis of cell population models
N. C. P. Fernandes and J. A. A. M. Castro	447	Modeling intra-particle convection in heterogeneous non-catalytic reacting systems
P. Huizenga, J. A. M. Kuipers and W. P. M. van Swaaij	457	A two-dimensional hydrodynamic model of a slurry system with immersed filters
M. D. Pritzker	473	Model for parallel surface and pore diffusion of an adsorbate in a spherical adsorbent particle
M. Tapp, S. Kauchali, B. Hausberger, C. McGregor, D. Hildebrandt and D. Glasser	479	An experimental simulation of distillation column concentration profiles using a batch apparatus
A. Alexander, F. J. Muzzio and T. Shinbrot	487	Segregation patterns in V-blenders
T. Thyagarajan, C.-C. Yu and H.-P. Huang	497	Assessment of controller performance: a relay feedback approach
<i>Shorter Communication</i>		
K. Terasaka and H. Tsuge	513	Gas holdup for slug bubble flow of viscous liquids having a yield stress in bubble columns

Numbers 3-6

ISCRE 17

P. L. Yue, W.-K. Yuan and M. Kwauk	519	Foreword
---	-----	----------

PLENARY LECTURES

J. Li and M. Kwauk	521	Exploring complex systems in chemical engineering—the multi-scale methodology
K. Okuyama and I. W. Lenggoro	537	Preparation of nanoparticles via spray route
S. A. Gembicki, K. M. VandenBussche and A. R. Oroskar	549	Novel tools to speed up the technology commercialization process
B. Smit and R. Krishna	557	Molecular simulations in zeolitic process design

NOVEL REACTORS AND PROCESSES

- | | | |
|--|-----|--|
| J.-F. Chen, L. Shao, F. Guo and X.-M. Wang | 569 | Synthesis of nano-fibers of aluminum hydroxide in novel rotating packed bed reactor |
| Y. Zeng, S. Tamhankar, N. Ramprasad, F. Fitch, D. Acharya and R. Wolf | 577 | A novel cyclic process for synthesis gas production |
| R. M. de Deugd, R. B. Chougule, M. T. Kreutzer, F. M. Meeuse, J. Grievink, F. Kapteijn and J. A. Moulijn | 583 | Is a monolithic loop reactor a viable option for Fischer-Tropsch synthesis? |
| B. Glöckler, G. Kolios and G. Eigenberger | 593 | Analysis of a novel reverse-flow reactor concept for autothermal methane steam reforming |

POLYMERIZATION REACTIONS AND REACTORS

- | | | |
|---------------------------|-----|---|
| M.-J. Park and H.-K. Rhee | 603 | Property evaluation and control in a semibatch MMA/MA solution copolymerization reactor |
|---------------------------|-----|---|

CATALYSIS AND CATALYTIC REACTORS

- | | | |
|---|-----|---|
| E. H. L. Yuen, A. J. Sederman, F. Sani, P. Alexander and L. F. Gladden | 613 | Correlations between local conversion and hydrodynamics in a 3-D fixed-bed esterification process: An MRI and lattice-Boltzmann study |
| E. Dias, A. T. Davies, M. D. Mantle, D. Roy and L. F. Gladden | 621 | Study of structure-function relationships in platinum-silica catalysts using hydrocarbon hydrogenation as a probe reaction |
| R. V. Chaudhari, C. V. Rode, R. M. Deshpande, R. Jaganathan, T. M. Leib and P. L. Mills | 627 | Kinetics of hydrogenation of maleic acid in a batch slurry reactor using a bimetallic Ru-Re/C catalyst |
| R. Schwiedernoch, S. Tischer, C. Correa and O. Deutschmann | 633 | Experimental and numerical study on the transient behavior of partial oxidation of methane in a catalytic monolith |
| M. Dente, S. Pierucci, E. Tronconi, M. Cecchini and F. Ghelfi | 643 | Selective oxidation of <i>n</i> -butane to maleic anhydride in fluid bed reactors: detailed kinetic investigation and reactor modelling |
| T. Masuda, T. Asanuma, M. Shouji, S. R. Mukai, M. Kawase and K. Hashimoto | 649 | Methanol to olefins using ZSM-5 zeolite catalyst membrane reactor |
| S. Raimondeau and D. G. Vlachos | 657 | Front propagation at low temperatures and multiscale modeling for the catalytic combustion of H ₂ on Pt |
| K. Engelen, Y. Zhang, D. J. Draelants and G. V. Baron | 665 | A novel catalytic filter for tar removal from biomass gasification gas: Improvement of the catalytic activity in presence of H ₂ S |
| Y. Ozawa, Y. Tochiara, M. Nagai and S. Omi | 671 | PdO/Al ₂ O ₃ in catalytic combustion of methane: stabilization and deactivation |
| J. Feng, X. Hu, P. L. Yue, H. Y. Zhu and G. Q. Lu | 679 | A novel laponite clay-based Fe nanocomposite and its photo-catalytic activity in photo-assisted degradation of Orange II |

F. L. Y. Lam and X. Hu

- 687 A new system design for the preparation of copper/activated carbon catalyst by metal-organic chemical vapor deposition method

FLUIDIZED BED AND MULTIPHASE REACTORS

M. I. Urseanu, R. P. M. Guit, A. Stankiewicz, G. van Kranenburg and J. H. G. M. Lommen

- 697 Influence of operating pressure on the gas hold-up in bubble columns for high viscous media

J. Ellenberger and R. Krishna

- 705 Shaken, not stirred, bubble column reactors: Enhancement of mass transfer by vibration excitement

J. Li and J. A. M. Kuipers

- 711 Gas-particle interactions in dense gas-fluidized beds

A. Forret, J.-M. Schweitzer, T. Gauthier, R. Krishna and D. Schweich

- 719 Influence of scale on the hydrodynamics of bubble column reactors: an experimental study in columns of 0.1, 0.4 and 1 m diameters

S. R. A. Kersten, W. Prins, B. van der Drift and W. P. M. van Swaaij

- 725 Principles of a novel multistage circulating fluidized bed reactor for biomass gasification

B. Marwaha and D. Luss

- 733 Hot zones formation in packed bed reactors

BIOREACTORS AND BIOPROCESSES

G. Spigno, C. Pagella, M. D. Fumi, R. Molteni and D. M. De Faveri

- 739 VOCs removal from waste gases: gas-phase bioreactor for the abatement of hexane by *Aspergillus niger*

S. R. Lamping, H. Zhang, B. Allen and P. Ayazi Shamlou

- 747 Design of a prototype miniature bioreactor for high throughput automated bioprocessing

P. Çalik, E. Bilir, G. Çalik and T. H. Özdamar

- 759 Bioreactor operation parameters as tools for metabolic regulations in fermentation processes: influence of pH conditions

W. Qi, Z. He and D. Shi

- 767 Product distribution of casein tryptic hydrolysis based on HPSEC analysis and molecular mechanism

B. Haut, H. Ben Amor, L. Coulon, A. Jacquet and V. Halloin

- 777 Hydrodynamics and mass transfer in a Couette-Taylor bioreactor for the culture of animal cells

D.-M. Bai, M.-Z. Jia, X.-M. Zhao, R. Ban, F. Shen, X.-G. Li and S.-M. Xu

- 785 L(+)-lactic acid production by pellet-form *Rhizopus oryzae* R1021 in a stirred tank fermentor

A. Namjoshi, A. Kienle and D. Ramkrishna

- 793 Steady-state multiplicity in bioreactors: bifurcation analysis of cybernetic models

MULTIFUNCTIONAL REACTORS

V. Diakov and A. Varma

- 801 Methanol oxidative dehydrogenation in a packed-bed membrane reactor: yield optimization experiments and model

H. J. Gorissen

- 809 A general approach for the conceptual design of counter-current reactive separations

F. Delogu, R. Orrù and G. Cao

- 815 A novel macrokinetic approach for mechanochemical reactions

REACTOR DYNAMICS AND CONTROL

- W. Warsito and L.-S. Fan 823 ECT imaging of three-phase fluidized bed based on three-phase capacitance model
- A. Jaree, R. R. Hudgins, H. Budman, P. L. Silveston, V. Yakhnin and M. Menzinger 833 Amplification of inlet temperature disturbances in a packed-bed reactor for CO oxidation over Pt/Al₂O₃
- A. Beckmann and F. J. Keil 841 Increasing yield and operating time of SLP-catalyst processes by flow reversal and instationary operation
- M. Li and P. D. Christofides 849 Modeling and analysis of HVOF thermal spray process accounting for powder size distribution

MODELING AND SIMULATION

- V. K. Pareek, S. J. Cox, M. P. Brungs, B. Young and A. A. Adesina 859 Computational fluid dynamic (CFD) simulation of a pilot-scale annular bubble column photocatalytic reactor
- Y.-N. Wang, Y.-Y. Xu, Y.-W. Li, Y.-L. Zhao and B.-J. Zhang 867 Heterogeneous modeling for fixed-bed Fischer-Tropsch synthesis: Reactor model and its applications
- J. De Wilde, G. B. Marin and G. J. Heynderickx 877 The effects of abrupt *T*-outlets in a riser: 3D simulation using the kinetic theory of granular flow
- D. Wang, Z. Li, C. Luo, W. Weng and H. Wan 887 OH spillover from a γ -Al₂O₃ support in the partial oxidation of methane over Ru/Al₂O₃
- M. A. Snyder, D. G. Vlachos and M. A. Katsoulakis 895 Mesoscopic modeling of transport and reaction in microporous crystalline membranes
- H. Freund, T. Zeiser, F. Huber, E. Klemm, G. Brenner, F. Durst and G. Emig 903 Numerical simulations of single phase reacting flows in randomly packed fixed-bed reactors and experimental validation
- Z. Zhang, W. A. Anderson and M. Moo-Young 911 Modeling of corrugated plate photocatalytic reactors and experimental validation
- S. Limtrakul, A. Chalermwattana, K. Unggurawirote, Y. Tsuji, T. Kawaguchi and W. Tanthapanichakoon 915 Discrete particle simulation of solids motion in a gas-solid fluidized bed
- Q. Wu, X. Hu and P.-I. Yue 923 Kinetics study on catalytic wet air oxidation of phenol

ENVIRONMENTAL APPLICATIONS

- F. Shiraishi, S. Yamaguchi and Y. Ohbuchi 929 A rapid treatment of formaldehyde in a highly tight room using a photocatalytic reactor combined with a continuous adsorption and desorption apparatus
- Y. Ikushima, O. Sato, M. Sato, K. Hatakeda and M. Arai 935 Innovations in chemical reaction processes using supercritical water: an environmental application to the production of ϵ -caprolactam
- H. Ibrahim and H. de Lasa 943 Photo-catalytic degradation of air borne pollutants apparent quantum efficiencies in a novel photo-CREC-air reactor

- D. Fino, P. Fino, G. Saracco and V. Specchia 951 Innovative means for the catalytic regeneration of particulate traps for diesel exhaust cleaning
- A. J. Maira, W. N. Lau, C. Y. Lee, P. L. Yue, C. K. Chan and K. L. Yeung 959 Performance of a membrane-catalyst for photocatalytic oxidation of volatile organic compounds
- A. M. T. Silva, I. M. Castelo-Branco, R. M. Quinta-Ferreira and J. Levec 963 Catalytic studies in wet oxidation of effluents from formaldehyde industry
- P. Monneyron, M.-H. Manero, J.-N. Foussard, F. Benoit-Marquié and M.-T. Maurette 971 Heterogeneous photocatalysis of butanol and methyl ethyl ketone—characterization of catalyst and dynamic study
- R. J. Brandi, M. A. Citroni, O. M. Alfano and A. E. Cassano 979 Absolute quantum yields in photocatalytic slurry reactors
- F. Shen, X. Chen, P. Gao and G. Chen 987 Electrochemical removal of fluoride ions from industrial wastewater
- X. Chen, G. Chen and P. L. Yue 995 Anodic oxidation of dyes at novel Ti/B-diamond electrodes
- M. J. Prins, K. J. Ptasinski and F. J. J. G. Janssen 1003 Thermodynamics of gas-char reactions: first and second law analysis
- P. Gao, W. H. Ching, M. Herrmann, C. K. Chan and P. L. Yue 1013 Photooxidation of a model pollutant in an oscillatory flow reactor with baffles

FUEL CELLS

- Y.-L. Zhou, X.-S. Zhang, Y.-C. Dai and W.-K. Yuan 1021 Studies on chemical activators for electrode I: Electrochemical activation of deactivating cathode for oxalic acid reduction
- P. Heidebrecht and K. Sundmacher 1029 Molten carbonate fuel cell (MCFC) with internal reforming: model-based analysis of cell dynamics

RESOURCE CONSERVATION

- L. D. Schmidt, E. J. Klein, C. A. Leclerc, J. J. Krummenacher and K. N. West 1037 Syngas in millisecond reactors: higher alkanes and fast lightoff
- J.-Y. Ren, Y. Fan, F. N. Egolfopoulos and T. T. Tsotsis 1043 Membrane-based reactive separations for power generation applications: oxygen lancing

MIXING AND MASS TRANSFER

- S. Chakraborty and V. Balakotaiah 1053 A novel approach for describing mixing effects in homogeneous reactors
- J. G. Khinast, A. Bauer, D. Bolz and A. Panarello 1063 Mass-transfer enhancement by static mixers in a wall-coated catalytic reactor
- H. Cui, P. Sauriol and J. Chaouki 1071 High temperature fluidized bed reactor: measurements, hydrodynamics and simulation
- A. Di Benedetto, F. S. Marra and G. Russo 1079 Heat and mass fluxes in presence of superficial reaction in a not completely developed laminar flow

**R. P. Fishwick, J. M. Winterbottom and
E. H. Stitt**

- 1087 Effect of gassing rate on solid-liquid mass transfer coefficients and particle slip velocities in stirred tank reactors

Number 7

Y. O. Jeong and D. Luss

- 1095 Pollutant destruction in a reverse-flow chromatographic reactor

**Z. Jiang, K.-S. Chung, G.-R. Kim and
J.-S. Chung**

- 1103 Mass transfer characteristics of wire-mesh honeycomb reactors

**T. A. Nijhuis, F. M. Dautzenberg and
J. A. Moulijn**

- 1113 Modeling of monolithic and trickle-bed reactors for the hydrogenation of styrene

P. N. Mandare and V. G. Pangarkar

- 1125 Semi-batch reactive crystallization of sodium perborate tetrahydrate: effect of mixing parameters on crystal size

**M. Ben-Tullilah, E. Alajem, R. Gal and
M. Sheintuch**

- 1135 Flow-rate effects in flow-reversal reactors: experiments, simulations and approximations

S. Kjelstrup and G. M. de Koeijer

- 1147 Transport equations for distillation of ethanol and water from the entropy production rate

**J. W. Ma, J. A. Smith, K. B. McAuley,
M. F. Cunningham, B. Keoshkerian and
M. K. Georges**

- 1163 Nitroxide-mediated radical polymerization of styrene in miniemulsion: model studies of alkoxyamine-initiated systems

**J. W. Ma, M. F. Cunningham, K. B. McAuley,
B. Keoshkerian and M. Georges**

- 1177 Nitroxide mediated living radical polymerization of styrene in miniemulsion—modelling persulfate-initiated systems

M. Favelukis and R. R. Mudunuri

- 1191 Unsteady mass transfer in the continuous phase around axisymmetric drops of revolution

L. Huilin, H. Yurong and D. Gidaspo

- 1197 Hydrodynamic modelling of binary mixture in a gas bubbling fluidized bed using the kinetic theory of granular flow

L. Özkan, M. V. Kothare and C. Georgakis

- 1207 Control of a solution copolymerization reactor using multi-model predictive control

**D. Dittmar, A. Fredenhagen, S. B. Oei and
R. Eggers**

- 1223 Interfacial tensions of ethanol-carbon dioxide and ethanol-nitrogen. Dependence of the interfacial tension on the fluid density—prerequisites and physical reasoning

C.-D. Ho and W.-Y. Yang

- 1235 An analytical study of heat-transfer efficiency in laminar counterflow concentric circular tubes with external refluxes

M. M. Attarakih, H.-J. Bart and N. M. Faqir

- 1251 Optimal moving and fixed grids for the solution of discretized population balances in batch and continuous systems: droplet breakage

M. J. Biggs, S. J. Humby, A. Buts and U. Tüzün

- 1271 Explicit numerical simulation of suspension flow with deposition in porous media: influence of local flow field variation on deposition processes predicted by trajectory methods

M. J. Okasinski and M. F. Doherty

- 1289 Simultaneous kinetic resolution of chiral propylene oxide and propylene glycol in a continuous reactive distillation column

- | | | |
|--|------|--|
| G. Rexwinkel, J. T. A. M. Berkhout and A. B. M. Heesink | 1301 | Adsorption of chlorinated hydrocarbons from aqueous solutions by wetted and non-wetted synthetic sorbents: dynamics |
| A. P. Vieira Soares, M. Farinha Portela, A. Kiennemann and L. Hilaire | 1315 | Mechanism of deactivation of iron-molybdate catalysts prepared by coprecipitation and sol-gel techniques in methanol to formaldehyde oxidation |
| C. Tien and R. Bai | 1323 | An assessment of the conventional cake filtration theory |
| D. Manca and M. Rovaglio | 1337 | Modeling the controlled release of microencapsulated drugs: theory and experimental validation |
| C. Desnoyer, O. Masbernat and C. Gourdon | 1353 | Experimental study of drop size distributions at high phase ratio in liquid-liquid dispersions |
| T. V. Malleswara Rao and R. P. Chhabra | 1365 | A note on pressure drop for the cross-flow of power-law liquids and air/power law liquid mixtures past a bundle of circular rods |

Shorter communication

- | | | |
|---|------|---|
| I. Iliuta, B. P. A. Grandjean, S. Piché and F. Larachi | 1373 | Two-fluid model for counter-current dumped packing-containing columns |
|---|------|---|

Number 8

- | | | |
|--|------|---|
| K. Ramanathan, V. Balakotaiah and D. H. West | 1381 | Light-off criterion and transient analysis of catalytic monoliths |
| T.-S. Chen and J.-M. Chern | 1407 | General rate equations and their applications for cyclic reaction networks: pyramidal systems |
| T. Xie, S. M. Ghiaasiaan, S. Karrila and T. McDonough | 1417 | Flow regimes and gas holdup in paper pulp-water-gas three-phase slurry flow |
| J. M. T. Vasconcelos, J. M. L. Rodrigues, S. C. P. Orvalho, S. S. Alves, R. L. Mendes and A. Reis | 1431 | Effect of contaminants on mass transfer coefficients in bubble column and airlift contactors |
| M. Sheintuch and O. Nekhamkina | 1441 | Thermal patterns in simple models of cylindrical reactors |
| C. Ohlinger and B. Kraushaar-Czarnetzki | 1453 | Improved processing stability in the hydrogenation of dimethyl maleate to γ -butyrolactone, 1,4-butanediol and tetrahydrofuran |
| C. Beta, K. Schneider, M. Farge and H. Bockhorn | 1463 | Numerical study of mixing of passive and reactive scalars in two-dimensional turbulent flows using orthogonal wavelet filtering |
| P. Garhyan, S. S. E. H. Elnashaie, S. M. Al-Haddad, G. Ibrahim and S. S. Elshishini | 1479 | Exploration and exploitation of bifurcation/chaotic behavior of a continuous fermentor for the production of ethanol |
| F. Larachi, B. P. A. Grandjean and J. Chaouki | 1497 | Mixing and circulation of solids in spouted beds: particle tracking and Monte Carlo emulation of the gross flow pattern |

M. Tayakout-Fayolle, C. Jallut, E. Pollet and T. Hamaide	1509	Combination of a Monte Carlo approach with the contact time distribution concept for the steady-state modeling of an isothermal heterogeneous coordinated anionic ring opening polymerization reactor
A. J. J. van der Zanden and E. L. J. Goossens	1521	The measurement of the diffusion coefficient and the sorption isotherm of water in paint films
B. Xue and Y. Sun	1531	Modeling of sedimentation of polydisperse spherical beads with a broad size distribution
Ph. Bogaerts, J.-L. Delcoux and R. Hanus	1545	Maximum likelihood estimation of pseudo-stoichiometry in macroscopic biological reaction schemes
W. Ge and J. Li	1565	Macro-scale phenomena reproduced in microscopic systems—pseudo-particle modeling of fluidization
G. de Koeijer and R. Rivero	1587	Entropy production and exergy loss in experimental distillation columns
X. Wu and J. C. Merchuk	1599	Measurement of fluid flow in the downcomer of an internal loop airlift reactor using an optical trajectory-tracking system
M. Campolo, F. Sbrizzai and A. Soldati	1615	Time-dependent flow structures and Lagrangian mixing in Rushton-impeller baffled-tank reactor
Y. M. Shtemler, I. R. Shreiber and M. Herskowitz	1631	Micro-level instability of bubble flows in packings
<i>Shorter Communication</i>		
Y. Zhang and J. M. Reese	1641	The drag force in two-fluid models of gas-solid flows
<i>Correspondence</i>		
V. Linek, T. Moucha and M. Kordač	1645	Simultaneous measurement of hold-up profiles and interfacial area using LDA in bubble columns: predictions by multiresolution analysis and comparison with experiments
A. A. Kulkarni and J. B. Joshi	1647	Author's reply

Number 9

A. Bhagwat, R. Srinivasan and P. R. Krishnaswamy	1649	Multi-linear model-based fault detection during process transitions
M. Barigou, P. G. Fairhurst, P. J. Fryer and J.-P. Pain	1671	Concentric flow regime of solid-liquid food suspensions: theory and experiment
S. J. Lee, C. P. Chu, R. B. H. Tan, C. H. Wang and D. J. Lee	1687	Consolidation dewatering and centrifugal sedimentation of flocculated activated sludge
O. Gundogdu, M. A. Koenders, R. J. Wakeman and P. Wu	1703	Permeation through a bed on a vibrating medium: theory and experimental results

H.-S. Kim, J.-H. Shin, S.-I. Moon, M.-S. Yun and S.-P. Kim	1715	Electrochemical performances of gel polymer electrolytes using tetra(ethylene glycol) diacrylate
A. Seeger, U. Kertzscher, K. Affeld and E. Wellenhofer	1721	Measurement of the local velocity of the solid phase and the local solid hold-up in a three-phase flow by X-ray based particle tracking velocimetry (XPTV)
E. Olmos, C. Gentric, S. Poncin and N. Midoux	1731	Description of flow regime transitions in bubble columns via laser Doppler anemometry signals processing
R. Masoudi, M. Arjmandi and B. Tohidi	1743	Extension of Valderrama-Patel-Teja equation of state to modelling single and mixed electrolyte solutions
G. J. Suppes, M. J. Goff and S. Lopes	1751	Latent heat characteristics of fatty acid derivatives pursuant phase change material applications
U. Parasu Veera	1765	Mass transport models for a single particle in gas-phase propylene polymerisation
P. Cruz, M. A. Alves, F. D. Magalhães and A. Mendes	1777	Solution of hyperbolic PDEs using a stable adaptive multiresolution method
F. Laurent, C. J. Pope, H. Mahzoul, L. Delfosse and P. Gilot	1793	Modelling of NO _x adsorption over NO _x adsorbents
S. Issanchou, P. Cognet and M. Cabassud	1805	Precise parameter estimation for chemical batch reactions in heterogeneous medium
J. E. P. Monteagudo, L. F. L. R. Silva and P. L. C. Lage	1815	Scaling laws for network model permeability: application to wellbore oil flow simulation with solid deposition
S. Alonso, F. Bertrand and P. A. Tanguy	1831	A torque-based analysis of the reverse roll coating process
T. Moucha, V. Linek and E. Prokopová	1839	Gas hold-up, mixing time and gas-liquid volumetric mass transfer coefficient of various multiple-impeller configurations: Rushton turbine, pitched blade and techmix impeller and their combinations
A. G. Dixon, J. Arias and J. Willey	1847	Wall-to-liquid mass transfer in fixed beds at low flow rates
C. Pomchaitaward, I. Manas-Zloczower and D. L. Fike	1859	Investigation of the dispersion of carbon black agglomerates of various sizes in simple-shear flows
J. C. Moran and L. R. Glicksman	1867	Mean and fluctuating gas phase velocities inside a circulating fluidized bed
J. C. Moran and L. R. Glicksman	1879	Experimental and numerical studies on the gas flow surrounding a single cluster applied to a circulating fluidized bed
G. P. Zhang and S. Rohani	1887	On-line optimal control of a seeded batch cooling crystallizer
H. Jin and B. Subramaniam	1897	Exothermic oxidations in supercritical CO ₂ : effects of pressure-tunable heat capacity on adiabatic temperature rise and parametric sensitivity

Number 10

Review

- | | | |
|--|------|---|
| V. N. Kiva, E. K. Hilmen and S. Skogestad | 1903 | Azeotropic phase equilibrium diagrams: a survey |
| E. Palazzi, F. Palazzi and B. Fabiano | 1955 | A unified short-cut model approach to size safe venting stacks and other blow-off devices for hazardous vapours |
| R. Mueller, L. Mädler and S. E. Pratsinis | 1969 | Nanoparticle synthesis at high production rates by flame spray pyrolysis |
| L. Li and E. Iglesia | 1977 | Modeling and analysis of hydrogen permeation in mixed proton-electronic conductors |
| A. Allamy, R. Mann and A. Holt | 1989 | Modelling of catalyst particle skin effects using a 3-D pore network model and quantitative microscopy |
| S. Lems, H. J. van der Kooi and J. de Swaan Arons | 2001 | Thermodynamic optimization of energy transfer in (bio)-chemical reaction systems |
| G. Özcan-Taskin and H. Wei | 2011 | The effect of impeller-to-tank diameter ratio on draw down of solids |
| W. Wu and M.-Y. Huang | 2023 | Nonlinear inferential control for an exothermic packed-bed reactor: geometric approaches |
| Y. T. Makkawi and P. C. Wright | 2035 | The voidage function and effective drag force for fluidized beds |
| J. Chevalier, P. Rousseaux, V. Benoit and B. Benadda | 2053 | Environmental assessment of flue gas cleaning processes of municipal solid waste incinerators by means of the life cycle assessment approach |
| F. Aiouache and S. Goto | 2065 | Sorption effect on kinetics of etherification of <i>tert</i> -amyl alcohol and ethanol |
| Y. I. Yoon, M. W. Kim, Y. S. Yoon and S. H. Kim | 2079 | A kinetic study on medium temperature desulfurization using a natural manganese ore |
| Y. Berman and A. Tamir | 2089 | Kinetics of droplets' sedimentation in a continuous gravity settler |
| T. Q. Gardner, J. L. Falconer, R. D. Noble and M. M. P. Zieverink | 2103 | Analysis of transient permeation fluxes into and out of membranes for adsorption measurements |
| E. Olmos, C. Gentric and N. Midoux | 2113 | Numerical description of flow regime transitions in bubble column reactors by a multiple gas phase model |
| R. N. Sharma and A. A. Shaikh | 2123 | Solids suspension in stirred tanks with pitched blade turbines |
| W. Kelly and B. Gigas | 2141 | Using CFD to predict the behavior of power law fluids near axial-flow impellers operating in the transitional flow regime |
| A. Ramadan, P. Skalle and S. T. Johansen | 2153 | A mechanistic model to determine the critical flow velocity required to initiate the movement of spherical bed particles in inclined channels |

Number 11

	2165	Seventeenth P. V. Danckwerts Memorial lecture
R. J. Batterham	2167	Ten years of sustainability: where do we go from here
A. T. Harris, J. F. Davidson and R.B. Thorpe	2181	Particle residence time distributions in circulating fluidised beds
R. Waschler, S. Pushpavanam and A. Kienle	2203	Multiple steady states in two-phase reactors under boiling conditions
P. Phanawadee, S. O. Shekhtman, C. Jarungmanorom, G. S. Yablonsky and J. T. Gleaves	2215	Uniformity in a thin-zone multi-pulse TAP experiment: numerical analysis
S. Liu	2229	Chemical kinetics of alkaline peroxide brightening of mechanical pulps
J. R. Burns, C. Ramshaw and R. J. Jachuck	2245	Measurement of liquid film thickness and the determination of spin-up radius on a rotating disc using an electrical resistance technique
K. Demeestere, J. Dewulf, H. Van Langenhove and B. Sercu	2255	Gas-solid adsorption of selected volatile organic compounds on titanium dioxide Degussa P25
G. Li Puma and P. L. Yue	2269	Modelling and design of thin-film slurry photocatalytic reactors for water purification
D. Sarkar and J. M. Modak	2283	Optimisation of fed-batch bioreactors using genetic algorithms
V. Roussinova, S. M. Kresta and R. Weetman	2297	Low frequency macroinstabilities in a stirred tank: scale-up and prediction based on large eddy simulations
S. Zhai, R. Taylor, R. Sanches and N. K. H. Slater	2313	Measurement of lyophilisation primary drying rates by freeze-drying microscopy
K. Kaczmarek, M. Gubernak, D. Zhou and G. Guiochon	2325	Application of the general rate model with the Maxwell-Stefan equations for the prediction of the band profiles of the 1-indanol enantiomers
H. Sovová and M. Zarevúcka	2339	Lipase-catalysed hydrolysis of blackcurrant oil in supercritical carbon dioxide
K. Feigl, S. F. M. Kaufmann, P. Fischer and E. J. Windhab	2351	A numerical procedure for calculating droplet deformation in dispersing flows and experimental verification
S. Maalej, B. Benadda and M. Otterbein	2365	Interfacial area and volumetric mass transfer coefficient in a bubble reactor at elevated pressures
B. Bijeljic, A. H. Muggeridge and M. J. Blunt	2377	Multicomponent mass transfer across water films during hydrocarbon gas injection
B. Huang, A. Malhotra and E. C. Tamayo	2389	Model predictive control relevant identification and validation

C. Phillips, A. Ben-Richou, A. Ambari and A. Fedorov	2403	Catalyst surface at a fractal of cost—a quest for optimal catalyst loading
P. P. Singh, J. H. Cushman and D. E. Maier	2409	Multiscale fluid transport theory for swelling biopolymers
A. Chauhan, C. Maldarelli, D. S. Rumschitzki and D. T. Papageorgiou	2421	An experimental investigation of the convective instability of a jet
<i>Shorter Communications</i>		
H.-K. Hsuen	2433	Approximate formulas for nonlinear diffusion and adsorption of a spherical particle
M. Dziubiński, M. Orczykowska and P. Budzyński	2441	Comments on bubble rising velocity in non-Newtonian liquids
B. Lin, R. Sureshkumar and J. L. Kardos	2445	Morphology of conducting polymeric coatings: quantitative comparison between theory and experiment
A. Adrover and M. Giona	2449	Experimental validation of a correlation-based model for permeability
S. Nedeltchev, S. Ookawara and K. Ogawa	2455	Mass transfer time in a deep bubble bed
W. Koros and W. Madden	2461	Comments on “Gas permeation through a glassy polymer membrane: Chemical potential gradient or dual mobility model?” by M. A. Islam and H. Buschatz [Chemical Engineering Science 57 (2002), 2089–2099]

Number 12

F. Aiouache, S. Goto	2465	Reactive distillation–pervaporation hybrid column for <i>tert</i> -amyl alcohol etherification with ethanol
S. Fan, S. P. Grettton-Watson, J. H. G. Steinke and E. Alpay	2479	Polymerisation of methyl methacrylate in a pilot-scale tubular reactor: modelling and experimental studies
C. J. Richardson and V. Nassehi	2491	Finite element modelling of concentration profiles in flow domains with curved porous boundaries
Y.-K. Chen, M. R. Mackley and T. S. B. Sayer	2505	Colour change and microstructure evolution of wet flowing paint when subject to shear
M. Punčochář and J. Drahoš	2515	Entropy of fluidized bed—a measure of particles mixing
H.-P. Luo, A. Kemoun, M. H. Al-Dahhan, J. M. F. Sevilla, J. L. García Sánchez, F. García Camacho and E. M. Grima	2519	Analysis of photobioreactors for culturing high-value microalgae and cyanobacteria via an advanced diagnostic technique: CARPT
I. Polishuk, J. Wisniak and H. Segura	2529	Simultaneous prediction of the critical and sub-critical phase behavior in mixtures using equations of state II. Carbon dioxide–heavy <i>n</i> -alkanes
M. P. Harold, B. Nair and G. Kolios	2551	Hydrogen generation in a Pd membrane fuel processor: assessment of methanol-based reaction systems

G. D. Yadav and S. P. Nalawade	2573	Selectivity engineering of 4-phenoxyacetophenone by acylation of diphenyl ether with ion exchange resins: modeling of catalyst deactivation and remedies
G. Sagawe, R. J. Brandi, D. Bahnemann and A. E. Cassano	2587	Photocatalytic reactors for treating water pollution with solar illumination. I: A simplified analysis for batch reactors
G. Sagawe, R. J. Brandi, D. Bahnemann and A. E. Cassano	2601	Photocatalytic reactors for treating water pollution with solar illumination. II: A simplified analysis for flow reactors
B. Dussoubs, J. Jourde, F. Patisson, J.-L. Houzelot and D. Ablitzer	2617	Modelling of a moving bed furnace for the production of uranium tetrafluoride Part 1: formulation of the model
B. Dussoubs, J. Jourde, F. Patisson, J.-L. Houzelot and D. Ablitzer	2629	Modelling of a moving bed furnace for the production of uranium tetrafluoride. Part 2: Application of the model
K. Mondal and S. B. Lalvani	2643	Mediator-assisted electrochemical hydrogenation of soy-bean oil
A. Burghardt and M. Berezowski	2657	Periodic solutions in a porous catalyst pellet—homoclinic orbits
J. Peng, T. F. Edgar and R. B. Eldridge	2671	Dynamic rate-based and equilibrium models for a packed reactive distillation column
G. D. Yadav, Y. B. Jadhav and S. Sengupta	2681	Novelties of kinetics and mechanism of liquid-liquid phase transfer catalysed reduction of <i>p</i> -nitroanisole to <i>p</i> -anisidine
P. O. Mchedlov-Petrosyan, W. B. Zimmerman and G. A. Khomenko	2691	Fast binary reactions in a heterogeneous catalytic batch reactor
S. Negny, M. Meyer and M. Prévost	2705	Modelling of the coupling hydrodynamic transfer for a gas-liquid countercurrent flow on a wavy surface
K. Ekambara and J. B. Joshi	2715	Axial mixing in pipe flows: turbulent and transition regions
F. B. Campos and P. L. C. Lage	2725	A numerical method for solving the transient multidimensional population balance equation using an Euler-Lagrange formulation
M. S. Strano and H. C. Foley	2745	Modeling ideal selectivity variation in nanoporous membranes
H.-S. Song, D. Ramkrishna, S. Trinh, R. L. Espinoza and H. Wright	2759	Multiplicity and sensitivity analysis of Fischer-Tropsch bubble column slurry reactors: plug-flow gas and well-mixed slurry model

Number 13

C. Vallieres, E. Favre, X. Arnold and D. Roizard	2767	Separation of binary mixtures by dense membrane processes: influence of inert gas entrance under variable downstream pressure conditions
E. Alpay, D. Chadwick, L. S. Kershenbaum, P. J. Barrie, C. Sivadinarayana and L. F. Gladden	2777	TEOM analysis of the equilibria and kinetics of <i>n</i> -hexane and <i>n</i> -heptane adsorption on FCC catalyst/silicalite

A. A. Iordanidis, M. van Sint Annaland, A. E. Kronberg and J. A. M. Kuipers	2785	A critical comparison between the wave model and the standard dispersion model
Y. Hasegawa, K.-I. Sotowa and K. Kusakabe	2797	Permeation behavior during the catalytic oxidation of CO in a Pt-loaded Y-type zeolite membrane
P. A. Melo, E. C. Biscaia Jr. and J. C. Pinto	2805	The bifurcation behavior of continuous free-radical solution loop polymerization reactors
H. Haario and L. Kalachev	2823	Asymptotic analysis of a complex reaction scheme in solid-liquid system
A. Ortiz-Arroyo, F. Larachi and I. Iliuta	2835	Method for inferring contact angle and for correlating static liquid hold-up in packed beds
A. Santomaso, P. Lazzaro and P. Canu	2857	Powder flowability and density ratios: the impact of granules packing
N. Kapur	2875	A parametric study of direct gravure coating
R. David, A. Fall and O. Lecoq	2883	Derivation of supersaturation and nucleation flux during precipitation from the mixing pattern of an inert tracer in the same device: case of unmixed feed streams
G. Barthelmes, S. E. Pratsinis and H. Buggisch	2893	Particle size distributions and viscosity of suspensions undergoing shear-induced coagulation and fragmentation
G. Madras and B. J. McCoy	2903	Continuous distribution theory for Ostwald ripening: comparison with the LSW approach
G. Sivalingam, S. Chattopadhyay and G. Madras	2911	Enzymatic degradation of poly (ϵ -caprolactone), poly (vinyl acetate) and their blends by lipases
P. Ji, H. J. van der Kooi and J. de Swaan Arons	2921	Simulation and thermodynamic analysis of conventional and oxygen permeable CPO reactors
B. H. Chang and Y. C. Bae	2931	Molecular thermodynamics approach for liquid-liquid equilibria of the symmetric polymer blend systems
L. Nikiforaki, G. Montante, K. C. Lee and M. Yianneskis	2937	On the origin, frequency and magnitude of macro-instabilities of the flows in stirred vessels
A. W. Patwardhan, A. B. Pandit and J. B. Joshi	2951	The role of convection and turbulent dispersion in blending
D.-Q. Lin, Y.-T. Wu, L.-H. Mei, Z.-Q. Zhu and S.-J. Yao	2963	Modeling the protein partitioning in aqueous polymer two-phase systems: influence of polymer concentration and molecular weight
A. A. Kiss, C. S. Bildea, A. C. Dimian and P. D. Iedema	2973	State multiplicity in PFR-separator-recycle polymerization systems
M. Farid	2985	A new approach to modelling of single droplet drying
S. Rode, K. Benkrid, T. Gillier and N. Midoux	2995	Bubble flow in trickle beds: investigations using resistive sensors
P. O. Mchedlov-Petrosyan, G. A. Khomenko and W. B. Zimmerman	3005	Nearly irreversible, fast heterogeneous reactions in pre-mixed flow

N. H. El-Farra and P. D. Christofides

- 3025 Bounded robust control of constrained multivariable nonlinear processes

*Shorter Communications***B. J. McCoy and G. Madras**

- 3049 Analytical solution for a population balance equation with aggregation and fragmentation

T. Shimizu, M. Peglow, K. Yamagiwa and M. Tanaka

- 3053 Comparison among attrition-reaction models of SO₂ capture by uncalcined limestone under pressurized fluidized bed combustion conditions

Number 14

A. Gil and L. M. Gandía

- 3059 Microstructure and quantitative estimation of the micro-pore-size distribution of an alumina-pillared clay from nitrogen adsorption at 77 K and carbon dioxide adsorption at 273 K

S. Rigopoulos and A. Jones

- 3077 A hybrid CFD—reaction engineering framework for multiphase reactor modelling: basic concept and application to bubble column reactors

M. Khayet

- 3091 The effects of air gap length on the internal and external morphology of hollow fiber membranes

S. G. Yiantsios and A. J. Karabelas

- 3105 Deposition of micron-sized particles on flat surfaces: effects of hydrodynamic and physicochemical conditions on particle attachment efficiency

Y. Lou and P. D. Christofides

- 3115 Estimation and control of surface roughness in thin film growth using kinetic Monte-Carlo models

D. Sarkar and J. M. Modak

- 3131 ANNSA: a hybrid artificial neural network/simulated annealing algorithm for optimal control problems

P. Cruz, J. C. Santos, F. D. Magalhães and A. Mendes

- 3143 Cyclic adsorption separation processes: analysis strategy and optimization procedure

F. Omota, A. C. Dimian and A. Blik

- 3159 Fatty acid esterification by reactive distillation. Part 1: equilibrium-based design

F. Omota, A. C. Dimian and A. Blik

- 3175 Fatty acid esterification by reactive distillation: Part 2—kinetics-based design for sulphated zirconia catalysts

G. Desmet, J. De Greef, H. Verelst and G. V. Baron

- 3187 Performance limits of isothermal packed bed and perforated monolithic bed reactors operated under laminar flow conditions. I. General optimization analysis

G. Desmet, J. De Greef, H. Verelst and G. V. Baron

- 3203 Performance limits of isothermal packed bed and perforated monolithic bed reactors operated under laminar flow conditions. Part II: performance comparison and design considerations

Y. Pan and J. H. Lee

- 3215 Recursive data-based prediction and control of product quality for a PMMA batch process

Y. J. Wang, Y. Wang, F. Chen, G. S. Luo and Y. Y. Dai	3223	Mass transfer characteristics of cadmium(II) extraction in hollow fiber modules
C. Y. Tai and W. C. Chien	3233	Interpreting the effects of operating variables on the induction period of $\text{CaCl}_2\text{--Na}_2\text{CO}_3$ system by a cluster coagulation model
R. A. Wright and C. Kravaris	3243	Nonlinear decoupling control in the presence of sensor and actuator deadtimes
D. Zhou, D. E. Cherrak, K. Kaczmarski, A. Cavazzini and G. Guiochon	3257	Prediction of the band profiles of the mixtures of the 1-indanol enantiomers from data acquired with the single racemic mixture
M. Kostoglou, P. Housiada and A. G. Konstandopoulos	3273	Multi-channel simulation of regeneration in honeycomb monolithic diesel particulate filters
<i>Shorter Communications</i>		
K. Warmuzinski and M. Tanczyk	3285	Calculation of the equalization pressure in PSA systems
G. Stephanopoulos	3291	Chemical and Biological Engineering
<i>Letter to the Editor</i>		
A. Yeckel	3295	Comments on "Robust iterative methods for solution of transport problems with flow: a block two-level preconditioned Schwarz-domain decomposition method for solution of nonlinear viscous flow problems"
M. Hartman and O. Trnka	3299	Calcination of calcium-based sorbents at pressure in a broad range of CO_2 concentrations
F. García-Labiano, A. Abad, L. F. de Diego, P. Gayán and J. Adánez	3301	Author's response to the comments by M. Hartman and O. Trnka

Number 15

S. Bandini and D. Vezzani	3303	Nanofiltration modeling: the role of dielectric exclusion in membrane characterization
K. Nakaso, K. Okuyama, M. Shimada and S. E. Pratsinis	3327	Effect of reaction temperature on CVD-made TiO_2 primary particle diameter
D. L. Marchisio, R. D. Vigil and R. O. Fox	3337	Implementation of the quadrature method of moments in CFD codes for aggregation-breakage problems
S. Wang, Y. Arimatsu, K. Koumatsu, K. Furumoto, M. Yoshimoto, K. Fukunaga and K. Nakao	3353	Gas holdup, liquid circulating velocity and mass transfer properties in a mini-scale external loop airlift bubble column
P. Li, G. Xiu and A. E. Rodrigues	3361	Modeling separation of proteins by inert core adsorbent in a batch adsorber
C. Tunca and D. M. Ford	3373	A hierarchical approach to the molecular modeling of diffusion and adsorption at nonzero loading in microporous materials

K. L. Wasewar, V. G. Pangarkar, A. B. M. Heesink and G. F. Versteeg	3385	Intensification of enzymatic conversion of glucose to lactic acid by reactive extraction
S.-Y. Chang and C.-T. Chang	3395	A fuzzy-logic based fault diagnosis strategy for process control loops
A. Varshney, P. Agrawal and A. N. Bhaskarwar	3413	Gas absorption with zero-order chemical reaction in a foam-bed reactor
G.-h. Xiu, P. Li and A. E. Rodrigues	3425	New generalized strategy for improving sorption-enhanced reaction process
K.-C. Loh and A. Geng	3439	Hydrodynamic dispersion in perfusion chromatography—a network model analysis
A. E. R. Bruce, P. S. T. Sai and K. Krishnaiah	3453	Liquid phase mixing in turbulent bed contactor
X. Huang, B. Wilhite, M. J. McCready and A. Varma	3465	Phenylacetylene hydrogenation in a three-phase catalytic packed-bed reactor: experiments and model
S. Motz, A. Mitrović, E.-D. Gilles, U. Vollmer and J. Raisch	3473	Modeling, simulation and stabilizing H_∞ -control of an oscillating continuous crystallizer with fines dissolution
C. Yin, L. Rosendahl, S. K. Kær and H. Sørensen	3489	Modelling the motion of cylindrical particles in a nonuniform flow
A. M. Fonseca, J. J. Órfão and R. L. Salcedo	3499	A new approach to the kinetic modeling of the reaction of gaseous HCl with solid lime at low temperatures
F. Fourcade, T. Tzedakis and A. Bergel	3507	Electrochemical process for metal recovery from iodized silver derivatives in liquid/solid mixture: Experimental and theoretical approaches
H.-S. Wu and C.-S. Wang	3523	Liquid–solid–liquid phase-transfer catalysis in sequential phosphazene reaction: kinetic investigation and reactor design
H. Niazmand and M. Renksizbulut	3535	Transient three-dimensional heat transfer from rotating spheres with surface blowing
T. Elperin and A. Fominykh	3555	Four stages of the simultaneous mass and heat transfer during bubble formation and rise in a bubbly absorber
<i>Shorter Communication</i>		
W. Wu, S.-Y. Lei, J.-H. Du and B.-X. Wang	3565	Relationship of threshold diameter and Darcean permeability in unconsolidated porous structures

Number 16

L. Kucka, I. Müller, E. Y. Kenig and A. Górák	3571	On the modelling and simulation of sour gas absorption by aqueous amine solutions
D. L. Marchisio and A. A. Barresi	3579	CFD simulation of mixing and reaction: the relevance of the micro-mixing model
S. Ebrahimi, C. Picioreanu, R. Kleerebezem, J. J. Heijnen and M. C. M. van Loosdrecht	3589	Rate-based modelling of SO_2 absorption into aqueous $\text{NaHCO}_3/\text{Na}_2\text{CO}_3$ solutions accompanied by the desorption of CO_2

Y. L. Yeow, S. R. Wickramasinghe, B. Han and Y.-K. Leong	3601	A new method of processing the time-concentration data of reaction kinetics
K. Stephan	3611	Multicomponent phase equilibria of thin liquid films and their vapour
V. Natraj and S. B. Chen	3621	Diffusion coefficient of a charged porous sphere
T. A. Albahri	3629	Flammability characteristics of pure hydrocarbons
C. Chatzidoukas, J. D. Perkins, E. N. Pistikopoulos and C. Kiparissides	3643	Optimal grade transition and selection of closed-loop controllers in a gas-phase olefin polymerization fluidized bed reactor
R.-B. Lin, S.-M. Shih and C.-F. Liu	3659	Characteristics and reactivities of $\text{Ca}(\text{OH})_2$ /silica fume sorbents for low-temperature flue gas desulfurization
A. T. Harris, J. F. Davidson and R. B. Thorpe	3669	The influence of the riser exit on the particle residence time distribution in a circulating fluidised bed riser
C. D. Immanuel and F. J. Doyle III	3681	Computationally efficient solution of population balance models incorporating nucleation, growth and coagulation: application to emulsion polymerization
P. Georgieva, M. J. Meireles and S. Fayo de Azevedo	3699	Knowledge-based hybrid modelling of a batch crystallisation when accounting for nucleation, growth and agglomeration phenomena
F. Puel, G. Févotte and J. P. Klein	3715	Simulation and analysis of industrial crystallization processes through multidimensional population balance equations. Part 1: a resolution algorithm based on the method of classes
F. Puel, G. Févotte and J. P. Klein	3729	Simulation and analysis of industrial crystallization processes through multidimensional population balance equations. Part 2: a study of semi-batch crystallization
C.-H. Huang, C.-Y. Yeh and H. R. B. Orlande	3741	A nonlinear inverse problem in simultaneously estimating the heat and mass production rates for a chemically reacting fluid
F.-S. Wang and K.-J. Lin	3753	Performance analysis and fuzzy optimization of a two-stage fermentation process with cell recycling including an extractor for lactic acid production
O. E. Azpitarte and G. C. Buscaglia	3765	Analytical and numerical evaluation of two-fluid model solutions for laminar fully developed bubbly two-phase flows
L. Huilin and D. Gidaspow	3777	Hydrodynamics of binary fluidization in a riser: CFD simulation using two granular temperatures
X. Li, Z.-S. Mao and W. Fei	3793	Effects of surface-active agents on mass transfer of a solute into single buoyancy driven drops in solvent extraction systems
P. Walker and R. Sheikholeslami	3807	Assessment of the effect of velocity and residence time in CaSO_4 precipitating flow reaction

Q. Xiong and A. Jutan	3817	Continuous optimization using a dynamic simplex method
K. B. Deshpande and S. Kumar	3829	A new characteristic of liquid-liquid systems—inversion holdup of intensely agitated dispersions
Number 17		
R. Mosdorf and M. Shoji	3837	Chaos in bubbling—nonlinear analysis and modelling
R. Hofmann and C. Posten	3847	Improvement of dead-end filtration of biopolymers with pressure electrofiltration
C. Galletti, E. Brunazzi, M. Yianneskis and A. Paglianti	3859	Spectral and wavelet analysis of the flow pattern transition with impeller clearance variations in a stirred vessel
M. Nordkvist, T. Grotkjær, J. S. Hummer and J. Villadsen	3877	Applying rotary jet heads for mixing and mass transfer in a forced recirculation tank reactor system
M. Yamamura, T. Kajiwara and H. Kage	3891	Multicomponent diffusion in phase-separating polymer blends with different frictional interactions: a mean-friction model
P. Ji, H. J. van der Kooi and J. de Swaan Arons	3901	Simulation and thermodynamic analysis of an integrated process with H ₂ membrane CPO reactor for pure H ₂ production
M. S. Granovskii and M. S. Safonov	3913	New integrated scheme of the closed gas-turbine cycle with synthesis gas production
T. Pugsley, H. Tanfara, S. Marcus, H. Cui, J. Chaouki and C. Winters	3923	Verification of fluidized bed electrical capacitance tomography measurements with a fibre optic probe
P. A. Quadros and C. M. S. G. Baptista	3935	Effective interfacial area in agitated liquid-liquid continuous reactors
M. Zafir and A. Gavrilidis	3947	Catalytic combustion assisted methane steam reforming in a catalytic plate reactor
J. G. Khinast, A. A. Koynov and T. M. Leib	3961	Reactive mass transfer at gas-liquid interfaces: impact of micro-scale fluid dynamics on yield and selectivity of liquid-phase cyclohexane oxidation
K. M. Moudgalya, S. K. Singh, K. P. Madhavan and G. Jain	3973	A class of discontinuous dynamical systems IV. A laboratory air-water system
F. Augier, J. Morchain, P. Guiraud and O. Masbernat	3985	Volume fraction gradient-induced flow patterns in a two-liquid phase mixing layer
D. Wu, L. Song, B. Zhang and Y. Li	3995	Effect of the mechanical failure of catalyst pellets on the pressure drop of a reactor
S. Claudel, C. Fonteix, J.-P. Leclerc and H.-G. Lintz	4005	Application of the possibility theory to the compartment modelling of flow pattern in industrial processes
P. P. Singh, J. H. Cushman and D. E. Maier	4017	Three scale thermomechanical theory for swelling biopolymeric systems

- A. Aroonwilas, A. Chakma, P. Tontiwachwuthikul and A. Veawab** 4037 Mathematical modelling of mass-transfer and hydrodynamics in CO₂ absorbers packed with structured packings
- A. N. Eraslan and T. A. Özbelge** 4055 Assessment of flow and heat transfer characteristics for proposed solid density distributions in dilute laminar slurry upflows through a concentric annulus
- N. J. Hepworth, J. W. R. Boyd, J. R. M. Hammond and J. Varley** 4071 Modelling the effect of liquid motion on bubble nucleation during beer dispense
- K. K. Tan and R. B. Thorpe** 4085 Erratum to "Transient instability of the flow induced by an impulsively started rotating cylinder" [Chemical Engineering Science 58 (2003) 149–156]

Number 18

Review

- S.-S. Feng and S. Chien** 4087 Chemotherapeutic engineering: Application and further development of chemical engineering principles for chemotherapy of cancer and other diseases
- T. L. van Noorden, S. M. Verduyn Lunel and A. Blik** 4115 Optimization of cyclically operated reactors and separators
- A. M. Vieira-Linhares and N. A. Seaton** 4129 Non-equilibrium molecular dynamics simulation of gas separation in a microporous carbon membrane
- B. P. Mandal, A. K. Biswas and S. S. Bandyopadhyay** 4137 Absorption of carbon dioxide into aqueous blends of 2-amino-2-methyl-1-propanol and diethanolamine
- H. Khim Teoh, E. Sorensen and N. Titchener-Hooker** 4145 Optimal operating policies for closed-loop recycling HPLC processes
- O. N. Cardoso, T. Sotto Mayor, A. M. F. R. Pinto and J. B. L. M. Campos** 4159 Axial dispersion of particles in a slugging column—the role of the laminar wake of the bubbles
- C. H. Liang, C. Y. Mou and D. J. Lee** 4173 Dynamic behavior and sensitivity of skeleton thermo-kinetic model for acetaldehyde oxidation
- S. M. A. Razavi, S. M. Mousavi and S. A. Mortazavi** 4185 Dynamic prediction of milk ultrafiltration performance: A neural network approach
- G. Löffler, S. Kaiser, K. Bosch and H. Hofbauer** 4197 Hydrodynamics of a dual fluidized-bed gasifier—Part I: simulation of a riser with gas injection and diffuser
- S. Kaiser, G. Löffler, K. Bosch and H. Hofbauer** 4215 Hydrodynamics of a dual fluidized bed gasifier. Part II: simulation of solid circulation rate, pressure loop and stability
- K. Zhu, S. Madhusudana Rao, C.-H. Wang and S. Sundaresan** 4225 Electrical capacitance tomography measurements on vertical and inclined pneumatic conveying of granular solids
- D. Xie, B. D. Bowen, J. R. Grace and C. J. Lim** 4247 A three-dimensional model for suspension-to-membrane-wall heat transfer in circulating fluidized beds

R. J. G. B. Campello, F. J. Von Zuben, W. C. Amaral, L. A. C. Meleiro and R. Maciel Filho	4259	Hierarchical fuzzy models within the framework of orthonormal basis functions and their application to bioprocess control
K. Wang, M. C. Hawley and T. D. Furney	4271	A selectivity study of 2,4-pentanediol hydrogenolysis combining experiments and computer simulation
J. L. Gómez, A. Bódalo, E. Gómez, J. Bastida and M. F. Máximo	4287	Two-parameter model for evaluating effectiveness factor for immobilized enzymes with reversible Michaelis-Menten kinetics
L. L. Martin and V. I. Manousiouthakis	4291	Globally optimal power cycle synthesis via the Infinite-DimensionAl State-space (IDEAS) approach featuring minimum area with fixed utility

Number 19

J. E. Haag, A. Vande Wouwer and I. Queinnec	4307	Macroscopic modelling and identification of an anaerobic waste treatment process
L. Gaete-Garretón, Y. Vargas-Hernandez, A. Chamayou, J. A. Dodds, W. Valderama-Reyes and F. Montoya-Vitini	4317	Development of an ultrasonic high-pressure roller press
M. S. Carvalho	4323	Effect of thickness and viscoelastic properties of roll cover on deformable roll coating flows
Z. Chen, Y. Yan and S. S. E. H. Elnashaie	4335	Novel circulating fast fluidized-bed membrane reformer for efficient production of hydrogen from steam reforming of methane
D. A. Nguyen, M. A. Iwaniw and H. S. Fogler	4351	Kinetics and mechanism of the reaction between ammonium and nitrite ions: experimental and theoretical studies
I. Polishuk, J. Wisniak and H. Segura	4363	Simultaneous prediction of the critical and sub-critical phase behavior in mixtures using equations of state III. Methane- <i>n</i> -alkanes
R. Xiong, J. Ida and Y. S. Lin	4377	Kinetics of carbon dioxide sorption on potassium-doped lithium zirconate
L. Wang and R. O. Fox	4387	Application of in situ adaptive tabulation to CFD simulation of nano-particle formation by reactive precipitation
J.-S. Bae and D. D. Do	4403	Surface diffusion of strongly adsorbing vapors in activated carbon by a differential permeation method
P. G. Cizmas, A. Palacios, T. O'Brien and M. Syamlal	4417	Proper-orthogonal decomposition of spatio-temporal patterns in fluidized beds
V. N. H. Nguyen, R. Amal and D. Beydoun	4429	Effect of formate and methanol on photoreduction/removal of toxic cadmium ions using TiO ₂ semiconductor as photocatalyst
A. M. Jade, B. Srikanth, V. K. Jayaraman, B. D. Kulkarni, J. P. Jog and L. Priya	4441	Feature extraction and denoising using kernel PCA
P. Y. Chen and H. J. Keh	4449	Boundary effects on osmophoresis: motion of a spherical vesicle parallel to two plane walls

J. Hubble	4465	Monte Carlo simulation of biospecific interactions between cells and surfaces
M. Corrias, B. Caussat, A. Ayral, J. Durand, Y. Kihn, Ph. Kalck and Ph. Serp	4475	Carbon nanotubes produced by fluidized bed catalytic CVD: first approach of the process
C. Hamel, S. Thomas, K. Schädlich and A. Seidel-Morgenstern	4483	Theoretical analysis of reactant dosing concepts to perform parallel-series reactions
E. Ginsburger, F. Pla, C. Fonteix, S. Hoppe, S. Massebeuf, P. Hobbes and P. Swaels	4493	Modelling and simulation of batch and semi-batch emulsion copolymerization of styrene and butyl acrylate
L. Farber, G. I. Tardos and J. N. Michaels	4515	Evolution and structure of drying material bridges of pharmaceutical excipients: studies on a microscope slide
Number 20		
S. Lain and R. Aliod	4527	Discussion on second-order dispersed phase Eulerian equations applied to turbulent particle-laden jet flows
I. Banerjee and M. G. Ierapetritou	4537	Development of an adaptive chemistry model considering micromixing effects
N. Yurt, H. Beyenal, J. Sears and Z. Lewandowski	4557	Quantifying selected growth parameters of <i>Leptothrix discophora</i> SP-6 in biofilms from oxygen concentration profiles
A. Gupta and D. Subba Rao	4567	Effect of feed atomization on FCC performance: simulation of entire unit
K. Wegner and S. E. Pratsinis	4581	Scale-up of nanoparticle synthesis in diffusion flame reactors
A. Oke, H. Mahgerefteh, I. Economou and Y. Rykov	4591	A transient outflow model for pipeline puncture
J. M. Zalc, S. C. Reyes and E. Iglesia	4605	Monte-Carlo simulations of surface and gas phase diffusion in complex porous structures
O. Rubio, J. Herguido and M. Menéndez	4619	Oxidative dehydrogenation of <i>n</i> -butane on V/MgO catalysts—kinetic study in anaerobic conditions
T. Wang, J. Wang and Y. Jin	4629	A novel theoretical breakup kernel function for bubbles/droplets in a turbulent flow
S. Xie and R. B. H. Tan	4639	Bubble formation at multiple orifices—bubbling synchronicity and frequency
J. Bridgwater, R. Utsumi, Z. Zhang and T. Tuladhar	4649	Particle attrition due to shearing—the effects of stress, strain and particle shape
J. Mabit, F. Fayolle and J. Legrand	4667	Shear rates investigation in a scraped surface heat exchanger
C. Ö. Karacan	4681	An effective method for resolving spatial distribution of adsorption kinetics in heterogeneous porous media: application for carbon dioxide sequestration in coal

Y. Zheng, S. Kiil and J. E. Johnsson	4695	Experimental investigation of a pilot-scale jet bubbling reactor for wet flue gas desulphurisation
J. F. Moxley, S. Tulyani and J. B. Benziger	4705	Steady-state multiplicity in the autohumidification polymer electrolyte membrane fuel cell
F. Pagnanelli, S. Mainelli, F. Vegliò and L. Toro	4709	Heavy metal removal by olive pomace: biosorbent characterisation and equilibrium modelling
J. H. J. Kluytmans, B. G. M. van Wachem, B. F. M. Kuster and J. C. Schouten	4719	Mass transfer in sparged and stirred reactors: influence of carbon particles and electrolyte
R. Monroy-Loperena and J. Alvarez-Ramirez	4729	A note on the identification and control of batch distillation columns
A. Çeçen Erbil	4739	Annulus leakage and distribution of the fluid flow in a liquid spout-fluid bed with a draft tube

Number 21

SPECIAL ISSUE

MATHEMATICS IN CHEMICAL KINETICS AND ENGINEERING: Papers presented at the MaCKiE-2002 Conference

Editorial

D. Constales, G. B. Marin, G. Nicolis, R. Van Keer and G. S. Yablonsky	4747	Mathematics in chemical kinetics and engineering: An introduction to the special issue dedicated to papers presented at the MaCKiE-2002 conference
A. N. Gorban and I. V. Karlin	4751	Method of invariant manifold for chemical kinetics
V. Balakotaiah and S. Chakraborty	4769	Averaging theory and low-dimensional models for chemical reactors and reacting flows
M.-O. Coppens and K. Malek	4787	Dynamic Monte-Carlo simulations of diffusion limited reactions in rough nanopores
N. V. Peskov, M. M. Slinko and N. I. Jaeger	4797	Stochastic model of reaction rate oscillations during CO oxidation over zeolite-supported catalysts
J. Kačur and R. Van Keer	4805	Numerical approximation of a flow and transport system in unsaturated-saturated porous media
N. Batens and R. Van Keer	4815	On a numerical relaxation method for a chemical reaction-diffusion problem with an instantaneous and irreversible reaction
A. De Wit, P. De Kepper, K. Benyaich, G. Dewel and P. Borckmans	4823	Hydrodynamical instability of spatially extended bistable chemical systems
G. S. Yablonsky, I. M. Y. Mareels and M. Lazman	4833	The principle of critical simplification in chemical kinetics

- | | | |
|--|------|--|
| S. O. Shekhtman, G. S. Yablonsky,
J. T. Gleaves and R. Fushimi | 4843 | "State defining" experiment in chemical kinetics—primary characterization of catalyst activity in a TAP experiment |
| D. Guillaume, K. Surla and P. Galtier | 4861 | From single events theory to molecular kinetics—application to industrial process modelling |
| D. G. Norton and D. G. Vlachos | 4871 | Combustion characteristics and flame stability at the microscale: a CFD study of premixed methane/air mixtures |
| A. J. M. Oprins and G. J. Heynderickx | 4883 | Calculation of three-dimensional flow and pressure fields in cracking furnaces |
| V. K. Bel'nov, N. M. Voskresenskii,
S. I. Serdyukov, I. I. Karpov and
V. V. Barelko | 4895 | Mathematical modeling of endothermic reactions in the catalyst unit with structured catalytic beds |
| M. Kolkowski, J. Malachowski, F. J. Keil,
C. Liebner, D. Wolf and M. Baerns | 4903 | Influences of heat transport on the determination of reaction rates using the temperature scanning plug flow reactor |
| B. Monnerat, L. Kiwi-Minsker and
A. Renken | 4911 | Mathematical modelling of the unsteady-state oxidation of nickel gauze catalysts |
| K. Pappaert, P. Van Hummelen,
J. Vanderhoeven, G. V. Baron and
G. Desmet | 4921 | Diffusion-reaction modelling of DNA hybridization kinetics on biochips |

Number 22

*Erratum***G. Stephanopoulos**

- 4931 Invited comment: Chemical and Biological Engineering

*Regular papers***M. Dadvar and M. Sahimi**

- 4935 Pore network model of deactivation of immobilized glucose isomerase in packed-bed reactors. Part III: Multi-scale modelling

G.R. Wang

- 4953 A rapid mixing process in continuous operation under periodic forcing

A. Subrenat, J. Bellettre and P. Le Cloirec

- 4965 3-D numerical simulations of flows in a cylindrical pleated filter packed with activated carbon cloth

J. Marriott and E. Sørensen

- 4975 A general approach to modelling membrane modules

J. Marriott and E. Sørensen

- 4991 The optimal design of membrane systems

P. Magnico

- 5005 Hydrodynamic and transport properties of packed beds in small tube-to-sphere diameter ratio: pore scale simulation using an Eulerian and a Lagrangian approach

P. Stevenson, S.P. Sullivan and G.J. Jameson

- 5025 Short-time tracer dispersion in a two-dimensional rising froth

J. Bao, W.Z. Zhang and P.L. Lee

- 5045 Decentralized fault-tolerant control system design for unstable processes

- R. Gutsche, R. Lange and W. Witt** 5055 The effect of process nonlinearities on the performance of a periodically operated isothermal catalytic reactor
- X. Ji and J. Yan** 5069 Saturated thermodynamic properties for the air–water system at elevated temperatures and pressures
- R. David, A. Fall and O. Lecoq** 5079 Derivation of supersaturation during precipitation from the mixing pattern of an inert tracer in the same device: case of partially premixed feed streams
- F.V. Caballero and L. Vicente** 5087 A simulation of oscillatory behavior in the $\text{NO} + \text{H}_2$ reaction on Pt(100): effect of diffusion and blocking sites
- P. Ananthan, G. Venkateswaran and J. Manjanna** 5103 Enhanced dissolution of hematite in reductive-complexing formulation under regenerative mode
- R. Müller, P.v. Zedtwitz, A. Wokaun and A. Steinfeld** 5111 Kinetic investigation on steam gasification of charcoal under direct high-flux irradiation
- Shorter Communication*
- U.V. Shenoy and D.M. Fraser** 5121 A new formulation of the Kremser equation for sizing mass exchangers

Numbers 23–24

- R. S. Ghadge, S. B. Sawant and J. B. Joshi** 5125 Enzyme deactivation in a bubble column, a stirred vessel and an inclined plane
- S. Heinrich, J. Blumschein, M. Henneberg, M. Ihlow, M. Peglow and L. Mörl** 5135 Study of dynamic multi-dimensional temperature and concentration distributions in liquid-sprayed fluidized beds
- Z. Q. Li, F. Wei and Y. Jin** 5161 Numerical simulation of pulverized coal combustion and NO formation
- S. J. Parulekar** 5173 Systematic performance analysis of continuous processes subject to multiple input cycling
- A. Aboudheir, P. Tontiwachwuthikul, A. Chakma and R. Idem** 5195 Kinetics of the reactive absorption of carbon dioxide in high CO_2 -loaded, concentrated aqueous monoethanolamine solutions
- I. Leifer, G. de Leeuw, G. Kunz and L. H. Cohen** 5211 Calibrating optical bubble size by the displaced-mass method
- H. Schramm, A. Kienle, M. Kaspereit and A. Seidel-Morgenstern** 5217 Improved operation of simulated moving bed processes through cyclic modulation of feed flow and feed concentration
- J.-H. Yoon, J.-I. Baek, Y. Yamamoto, T. Komai and T. Kawamura** 5229 Kinetics of removal of carbon dioxide by aqueous 2-amino-2-methyl-1,3-propanediol
- A. G. Gayubo, A. T. Aguayo, M. Olazar, R. Vivanco and J. Bilbao** 5239 Kinetics of the irreversible deactivation of the HZSM-5 catalyst in the MTO process
- A. M. Vieira-Linhares and N. A. Seaton** 5251 Pore network connectivity effects on gas separation in a microporous carbon membrane

J. Yun and Z. Shen	5257	Modeling of solid layer growth from melt for Taylor bubbles rising in a vertical crystallization tube
D. Barletta, G. Donsi, G. Ferrari and M. Poletto	5269	On the role and the origin of the gas pressure gradient in the discharge of fine solids from hoppers
L. Gales, A. Mendes and C. Costa	5279	Recovery of acetone, ethyl acetate and ethanol by thermal pressure swing adsorption
S. Srebnik	5291	Polymer adsorption on multicomponent surfaces with relevance to membrane fouling
L.-D. Shiau	5299	The distribution of dislocation activities among crystals in sucrose crystallization
I. Iliuta and F. Larachi	5305	Concept of bifunctional Redox iron-chelate process for H ₂ S removal in pulp and paper atmospheric emissions
B. Paliwal, A. Sharma, R. P. Chhabra and V. Eswaran	5315	Power law fluid flow past a square cylinder: momentum and heat transfer characteristics
K. Terasaka and H. Shibata	5331	Oxygen transfer in viscous non-Newtonian liquids having yield stress in bubble columns
J.-P. Hsu, S.-H. Hung, C.-Y. Kao and S. Tseng	5339	Electrophoresis of a spheroid along the axis of a cylindrical pore
M. Savelski and M. Bagajewicz	5349	On the necessary conditions of optimality of water utilization systems in process plants with multiple contaminants
G. Montante, D. Pinelli and F. Magelli	5363	Scale-up criteria for the solids distribution in slurry reactors stirred with multiple impellers
<i>Shorter Communication</i>		
L. Wang, D. Jin and J. Li	5373	Effect of dynamic change of flow structure on mass transfer between gas and particles
<i>Correspondence</i>		
P. Stevenson	5379	Comments on "Physical insight into the Ergun and Wen & Yu equations for fluid flow in packed and fluidised beds", by R.K. Niven [Chemical Engineering Science, Volume 57, 527-534]
Contents of Volume 58	III	
Author Index of Volume 58	XXXI	

